THE MISSISSIPPI ORAL HISTORY PROGRAM

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AN ORAL HISTORY

with

MR. HENRY F. AUTER

INTERVIEWER: Mr. R. Wayne Pyle

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THE MISSISSIPPI ORAL HISTORY PROGRAM IS UNDER THE POLICY DIRECTION OF THE ORAL HISTORY COMMITTEE COMPRISED OF THE FOLLOWING PERSONS:

Biography

Mr. Henry F. Auter served as deputy manager of the National Space Technology Laboratories (NSTL) in Hancock County, Mississippi, from the time of its construction in 1963 until 1980 when he retired. He saw, oversaw and participated in many of the changes which both the United States space program and NSTL have undergone since their respective inceptions.

The son of Henry Fenimore and Florence Furr Auter, he was born in Vicksburg, Mississippi, on September 26, 1924. His father was a Mississippi River steamboat pilot. After graduation from Carr Central High School in Vicksburg, in May, 1941, he completed two years of engineering studies at Mississippi State College before entering the United States Army as a combat engineer in the 1299th Engineer Combat Battalion. As such, he participated in the occupation of Japan after World War II.

After the war, Auter finished his electrical-engineering degree at Mississippi State, graduating in 1949, and worked as a civilian engineer with the Vicksburg District of the Army Corps at Engineers until 1951. As a member of the Air Force Reserves, he was recalled to active duty in the air force during the Korean War and there became interested in space and rocketry.

In June of 1953 Auter began work in the test laboratory of the Guided Missile Development Division, which became the United States Army Ballistic Missile Agency, located in Huntsville, Alabama. He worked as an electrical test engineer on the Redstone, Jupiter, Jupiter C, Pershing, Saturn I and Saturn V rockets. In 1960, as part of Dr. Wernher von Braun's team, he transferred to civilian employment with the National Aeronautics and Space Administration, also in Huntsville. Then in 1963 as NASA planned to build a major new test facility on the Mississippi Gulf Coast, Auter became deputy manager of the Mississippi Test Facility (now NSTL) where rocket engines were tested for both the Apollo lunar program and the Space Shuttle program, and where numerous government agencies now maintain installations.

Auter retired as deputy manager of NSTL in June of 1980. He presently owns and operates a book store in Picayune, Mississippi, and serves as a consultant. Also, he is actively involved in numerous civic and church activities.

AN ORAL HISTORY

with

Mr. HENRY AUTER

This is an interview for the Mississippi Oral History Program of the University of Southern Mississippi. The interview is with Mr. Henry Auter, who was deputy manager of the National Space Technology Laboratories, located in Hancock County north of Bay Saint Louis, Mississippi. The interview is taking place in Mr. Auter's home at 1200 Grice Avenue in Picayune, Mississippi, on October, 1, 1980. The interviewer is Mr. R. Wayne Pyle.

MR. PYLE: Mr. Auter, we would like to thank you again for spending this morning with us.

MR. AUTER: Thank you.

MR. PYLE: Sir, we'd like to start off with some biographical information concerning your background: go back to your grandparents, your parents, their occupations--where they were from and lived, that sort of thing.

MR. AUTER: All right. Well, let me start with my parents. I was born on September 26, 1924, and raised in Vicksburg, Mississippi. My father, Henry F. Auter, Sr., was a river pilot; his two brothers were river pilots also, and they were the last of the line of about five generations of Auter river pilots who originally resided up in Ohio and Kentucky and eventually moved their way down the river until my grandfather and his brothers located in Vicksburg.

MR. PYLE: That's interesting. Is your father still living?

MR. AUTER: No, he passed away in 1935.

MR. PYLE: Oh, I see. How about the uncles?

MR. AUTER: Both of them are gone also.

MR. PYLE: Okay, I'm sorry. I had the opportunity to interview a captain, John Marlow, who is also a riverboat pilot on the Mississippi, who retired just a few years ago and who lives in Vicksburg--that's why I asked.

MR. AUTER: Yes.

MR. PYLE: Okay.

MR. AUTER: And my mother was a housewife. She was Florence Virginia Furr, from down in Claiborne County, Mississippi. I knew my dad very little since he died in 1935 when I was eleven. I only have about three separate recollections of actually being with him since, number one, he was gone so much on the river, and second, the last five years of his life he was in the hospital in New Orleans due to an injury he received. But those were pretty good days of the old paddle-wheel steamer. He operated the ferry that crossed the river there at Vicksburg for quite a few years. He did pilot the big paddlewheeler, Sprague, [which] after decommissioning was given to the City of Vicksburg and later unfortunately burned. He worked for the government driving the quarterboats, which were

floating dormitories, and the workboats and that type of thing. Of course, when the bridges were being built across the river at Vicksburg, Natchez, Memphis and Greenville, well, that started putting some of the river traffic out of business, but particular the ferryboats. He also piloted the railroad transfer boats, the old sidewheelers that operated there at Vicksburg. One of them was named the Pelican, [which] now is a floating restaurant up on the Ohio [River] somewhere.

MR. PYLE: Is that right?

MR. AUTER: Yes. One of the old ferryboats that used to ply at Vicksburg--I believe it's the Alice B. Miller--was sold to China and was towed across to [China]. It operates over in Hong Kong somewhere, I believe. That's all hearsay. I don't have any proof of that.

MR. PYLE: I was wondering what the Chinese would need the ferryboats for.

MR. AUTER: Oh, down in Hong Kong, Shanghai and all those ports where they have little offshore islands, they use the ferryboats to transfer people. And let's see, my mother passed away in 1970 after having raised her family of four children. One of my brothers, Charles, passed away the year I was born. Then I have one sister, Florence, (who married Charles Amborn) and one other brother, John, who passed away in 1970. My sister is still living in Vicksburg.

MR. PYLE: Now I want to ask you if you'd give just a brief overview of your life up to the present and then I am going to go back and ask you questions over that period.

MR. AUTER: Okay.

MR. PYLE: You were born in 1924.

MR. AUTER: [I was] born in 1924 and went to school there in Vicksburg. Of course, that was a few years prior to the Depression which came in 1929. With my father being hurt in 1930 concurrent with the Depression, what insurance he had he had to borrow on and so we had some pretty hard times. Mother actually had to support the family while he was in the hospital and I can recall she made four dollars a week and she raised her family of three on four dollars a week.

MR. PYLE: That's amazing.

MR. AUTER: We had some pretty hard times.

MR. PYLE: I'm going to go back and ask you some questions on the Depression [later].

MR. AUTER: [laughter] Okay, so scooting on up--of course, because of that economic situation, I had to find employment while I was going to school and so I worked for a dairy and worked on up to be retail manager while I was still in high school. I had started school while I was still four years old, just prior to my fifth birthday, so I graduated from high school in 1941 when I was sixteen.

MR. PYLE: [From] Vicksburg High School?
MR. AUTER: In Vicksburg. It was the old Carr Central High School at that time.

MR. PYLE: Carr Central.

MR. AUTER: So I graduated in 1941 and-

MR. PYLE: That'd make you-

MR. AUTER: I beg your pardon?

MR. PYLE: That'd make you just right [for service in World War II], wouldn't it? [laughter]

MR. AUTER: I entered Mississippi State University that fall in the School of Engineering and got in two years of engineering before I was eligible for the draft. I was drafted in July of 1943. I went to Camp Shelby, Mississippi, Reception Center and was assigned to the Army Air Corps. At that time, one of the Army Air Corps' basic training centers was at Keesler Air Force Base and [I] went through Air Corps basic training. I had made good enough on the Army General Classification Test to where I qualified for the Army Specialized Training Program which would permit you to go on back to school. So I went on up to Purdue University and got in one semester of engineering there before the military situation in North Africa got to the point to where they could no longer afford to keep all these young men in college. So that program was broken up and they took some of us and put us in shorter specialized training programs and I wound up in an aerial phototypography course, which was supposed to be a five-month course. But the situation in Africa and Italy got worse, so they broke that up and all of us were reassigned all over the place. I wound up being reassigned to the Army Engineers. I went to Fort Leonard Wood, Missouri, and took engineer basic [training] and then was sent to New York City for a twelve-week electrician school training course. Upon completion of that in 1944, I went back to Fort Leonard Wood awaiting reassignment and was subsequently assigned to an engineer combat battalion, the 1299th Combat Battalion at Camp Bowie, Texas, and entered into a long period of specialized training which was aimed at the invasion of Japan. So finally, we departed there in June of 1945. We went to the Philippines and got in on the tail end of the problem there. I was in the Philippines when the war ended and, fortunately, we did not have to invade Japan, but went on up as a part of the initial army of occupation

I was discharged at Camp Shelby, Mississippi, in February, 1946. I was too late to re-enter State that semester, so I got a job as an inspector with R.G. LeTourneau Company in Vicksburg, which made earthmoving equipment. In the fall of 1946 I re-entered Mississippi State to continue my electrical engineering studies and finally graduated in January, 1949. In 1947, during spring break, I met my wife to be, Miriam Frances Noble, from Anguilla, Mississippi, and we got married on July 4, 1948. I lost my independence on Independence Day! [laughter] I had gotten a job with the Corps of Engineers there in Vicksburg as an electrical designer prior to my graduation and then went back there after graduation.

Oh, I should say that I determined that if I was going back in the military, I was not going back as an enlisted man, so I took advanced Air Force ROTC [Reserve Officer's Training Course] at State and got my commission as a second lieutenant upon graduation. So I stayed in Vicksburg until 1951 as a civilian engineer. Then with the Korean fracas they were recalling reservists, so I was recalled to active duty with the Air Force as a second lieutenant and first went to Lackland Air Force Base, Texas, for reception and was then assigned to Keesler Air Force Base to go through the Ground Electronics Officer's School. So my wife and I spent six months there at Keesler. We left there in about--oh, gosh, I don't know--November of 1951 and received an assignment at Jupiter Auxiliary Air Force Base in Florida just north of Palm Beach as a radar officer at a small tracking station. We stayed in the air force there at

Jupiter until I was released in April of 1953.

MR. PYLE: Jupiter? Is that the [name]?

MR. AUTER: Jupiter. J-U-P-I-T-E-R. There was an old Jupiter light house at Jupiter Inlet there. Prior to release from the Air Force, one of my duties there--among many--was [to be] the Information Education Officer, and I'd seen a series of articles in Collier's Magazine dealing with space. One of the articles was written by Wernher von Braun, so I used those as part of I&E [Information and Education] program. I got interested in the space business, really, at that point. I heard about what was going on up at the Redstone Arsenal at Huntsville, Alabama, in the missile program and Von Braun was up there working with the Army missile program, so I made application for a civilian transfer up there as an engineer. When I was released in April, they were unable to hire anybody due to a personnel freeze, so I returned to Vicksburg and went back to work with the Vicksburg District, Corps of Engineers, in civil works. About six weeks later, I received a telephone call asking me if I were available and I told them, "Yes!" So they put some orders on the wire and two weeks later I was in Huntsville not knowing what I was going to do, who I was going to be working for or what. But very fortunately, I got a good assignment with the test laboratory of the old Guided Missile Development Division, which was one of the elements under Dr. von Braun. So we arrived there in June of 1953 and went through a succession of very interesting activities having to do with the Redstone missile, the Jupiter missile, the Jupiter C, the Pershing, the Saturn I, the Saturn V, [and] being involved with the old Redstone missile that was used to launch America's first satellite into orbit and the forerunner of the vehicles that would be used in the Apollo Lunar Program. So from 1953 to 1960 I worked for the Army there at Huntsville [in the] Guided Missile Development Division, which grew into the Army Ballistic Missile Agency. Then in 1958 was the passage of the Space Act and the creation of the space agency, the National Aeronautics and Space Administration. NASA was building up its resources, so they arranged for the transfer of Dr. von Braun and a good part of his team that had been working on missiles to NASA to work on space vehicles. So [on] July 1, 1960, Dr. von Braun and many of us transferred en masse from the Army to NASA and the George C. Marshall Space Flight Center was created at Huntsville. I stayed with NASA from that point on until this year when I finally retired fully from government service [on] June 30, 1980. So I stayed at Huntsville with NASA working on the old Saturn I and Saturn IB programs.

Then I was offered the opportunity to become the deputy manager for a new test facility that was to be built in south Mississippi in Hancock County. It was necessary to build a new, large national test facility because all of the existing ones - that had been used during the '50s had been encroached upon by residential and commercial developments such that the acoustic energy generated by the static testing created very high vibrations in these privately-owned structures sufficient to cause damage and potential injury to persons. Therefore, this new one down here in south Mississippi was created to insure sufficient isolation of the test activity from populated areas. This was a selection from about thirty-six other sites throughout the country that were looked at, so it just wasn't happenstance.

I jumped at the chance, of course, to be able to come back to Mississippi. We started building this facility in 1963 and I started commuting down here practically full-time early in 1964. I moved my family down in June of 1965 and we've stayed in business here, went through the initial, or the acceptance, testing of all of the vehicles that were used in the Apollo Lunar Program--the Saturn V vehicle, both the first and second stages. Then that program went on through 1970 until we ran out of vehicles to test.

It looked for a long while like the facility may be mothballed, but the manager, Mr. Jackson Balch, was a very far-sighted individual [and he] said, "Well, if NASA doesn't have any immediate use for this great facility that cost almost three hundred million dollars to build, perhaps other elements of the government can use it." So we

launched on a campaign to attract other people in other agencies to come down and use this facility and put it to work and keep the employment level up [and so on]. After a long hard struggle that goal was finally achieved, and today every facility there is fully utilized. New large ones have been built [and] the place is humming, so we maintained the employment level pretty well. That sort of brings us up to date as far as employment and this type of thing. During that process, my wife and I acquired three children: two boys, Alan Henry and Kenneth Noble, and a girl, Amy Lorelle, and we've been involved in many other kinds of things not directly associated with NASA.

MR. PYLE: Okay. I'm going to go back and ask you some more specific questions about different parts of your life here as we've got it broken down.

EDITOR'S NOTE: At this point there was a brief interruption.

MR. PYLE: Born in 1924, you would have been six or seven when the Depression began to settle into Mississippi real well, and you had described your father's accident--the fact that he was hospitalized--so your problems would have been quite severe, then. Would you talk a little bit more about the Depression [and] your experiences in it? You mentioned that your mother had to go to work and obviously did all right raising you all on a meager pension.

MR. AUTER: First of all, it wasn't any pension. [laughter]

MR. PYLE: Yes, meager finances.

MR. AUTER: Yes, she worked for the WPA [Works Progress Administration] and--oh, there were several of those acronymi[c] programs there--the WPA, the PWA [Public Works Administration] and the CCC, the [Civilian Conservation Corps]. One job she had was to deliver work authorizations to people, primarily the blacks, that would enable the people to work sufficiently to where that they'd have enough money to buy food. It was different than the total welfare approach of today. And in order to help her, I [went with her]. One of my earliest remembrances is [of this].

She used to [take me because] I was young enough at that time [that] she couldn't leave me at home by myself and she couldn't hire anybody to sit with me, so she took me with her. Well, I got to know her route down through what we called at that time the Negro quarters. In the Vicksburg area, it's real hilly; and [of] most of the original inhabitants and the settlers, the white people lived up on top of the hills and the black people lived down in the hollows, and they weren't all in one section but they were around town. That seemed to be the way it happened: the blacks lived in the hollows and the whites lived up on top of the hill.

MR. PYLE: Rather than on the other side of the track, it was the bottom side of the hill.

MR. AUTER: Yes. And in later years it was to prove that the hollows were the more desirable building locations. [laughing] Nevertheless, getting back to Mother: I learned her routes and I learned the people almost as well as she did, such that after a while--and these things had to be taken out once a week--I could run her route for her and deliver her notices and let her stay home and rest and do other things. That may have been illegal, but I can only recall one instance when we had a problem. I had a good friend who had a bicycle--we couldn't afford a bike--but I spent a couple hours trying to talk him into lending me his bike so I could ride the route, and he wouldn't do it. So I finally had to run to make up lost time and get home before dark. In the process, I lost two or three of these work authorizations out of my pocket and I was in misery. [laughing] But I found them and I got home about ten o'clock that night. [laughter] That taught me a lesson, you know: don't always look for the easy way out because sometimes

it winds up being harder than doing it the way you are supposed to do it.

MR. PYLE: A good lesson to learn early in life.

MR. AUTER: Yes, but I think that all of us that were in that boat learned a lot of values in how to get along and how to survive. Unfortunately, it's a hard way to learn it, but I think it sticks with you, and perhaps that's one reason why the generations of today, the young people of today, don't have that opportunity because a lot of their parents went through it and the parents are determined, "Hey, they are not going to go through that!" But at the same time, they are hurting the young people by not facing them early enough with things.

But, oh, we made our own recreation. One of our favorite games in the neighborhood was stopper-ball.

MR. PYLE: Football?

MR. AUTER: Stopper-ball.

MR. PYLE: Okay. You got me there.

MR. AUTER: We didn't have enough money to buy bats and baseballs and this type of thing, so we'd get the caps off the Coke bottles--soft drink bottles--and use broomsticks for bats, and [we] used to sail these caps in--that was sort of like the forerunner of the Frisbee--we would sail these caps in and try to hit them with the broomstick.

MR. PYLE: That doesn't sound like it would be the easiest thing to do.

MR. AUTER: No, it's not! [laughter]

MR. PYLE: I can imagine.

MR. AUTER: And if you were the pitcher up there and the guy did hit it and it hit you in the forehead, well, you could get hurt. [laughter]

MR. PYLE: [You'd have to] duck.

MR. AUTER: And, of course, [we played] street hockey. You cut a limb off a tree and get a tin can out there; and if you are fortunate enough to have a pair of skates, well, you'd play on skates.

MR. PYLE: That'd really make it fun, then.

MR. AUTER: Then, after that can got hit two or three times and it got all krinkled up--they weren't aluminum in those days, they were steel, tin-coated steel--man, they'd hurt. But, oh, a big type of recreation at that time was jigsaw puzzles, and a lot of the gas stations used those as premiums. They would give away jigsaw puzzles.

MR. PYLE: Oh, is that right?

MR. AUTER: The theaters--gosh, I can remember on Saturday morning back when the western movies only ran

about sixty or sixty-five minutes, if you were lucky you could go to four different movies for about twenty-eight cents, if you timed it right. One of the local bakeries sponsored an early Saturday morning movie at a theater: you[d] go by the bakery and pick up a coupon, and you put a penny with it at the theater and that got you in the theater, plus a free ice cream cone.

MR. PYLE: Not bad! [laughter] A far cry from today.

MR. AUTER: That's right! So you go to that one and you'd go on down the street to another one, and that one cost you six cents. And another one you could get in for eleven cents. Then, if you got to the last one before one o'clock when the prices changed, you could get that one for seventeen cents.

But everybody--all the kids--worked at any job you could find and, of course, one of the favorite money raisers was selling used coathangers back to the cleaners. They would pay you a half a cent for each coathanger that you brought back, so all the closets in town were constantly stripped of coathangers. [Kids were] redeeming Coke bottles for a penny apiece--anything to make a little cash.

MR. PYLE: It's amazing how many ways there are to make cash when that little money will go so far.

MR. AUTER: And [there was] a lot of bartering going on. Let's see, somewhere along in there I got a morning paper route and had to get up at three o'clock in the morning to pick up the papers and get my route done before school started. Then I started working at this dairy when I was in the ninth grade, and that was in the afternoons from three to eleven. I still had that morning paper route, so I was getting about four hours of sleep at night. I guess for about two months there I [worked both jobs], then I had to give up that paper route.

MR. PYLE: Yes.

MR. AUTER: But [I was also] selling ice cream out on the street for a nickel a bar. I loved that thing. That shoulder box [enabled me] to make enough money to where I had gotten a bicycle and so then I could ride that bike; I could ride around and make more money. I was making up to five dollars a day profit in the afternoon after school selling ice cream on the street, and that was considerably more than a lot of grown men would make working all day long.

MR. PYLE: When you put that as compared to your mother's four dollars a week when she first started working for the WPA, five dollars a day was good money back then.

MR. AUTER: Certainly.

MR. PYLE: You were an enterprising young business man, then.

MR. AUTER: Well, you had to be to survive.

MR. PYLE: Sure.

MR. AUTER: To a degree, I think it tended to give me somewhat of an inferiority complex for a while, but--I don't know--I lost interest in school and, for some reason or other, I'd actually go in the morning and leave at noon. They were about to kick me out of school.

MR. PYLE: Is this once you were in junior high?

MR. AUTER: This was in tenth grade [in] high school.

MR. PYLE: Okay.

MR. AUTER: They were about to expel me from school. My older brother, John, quit high school in the tenth grade and [had] gone to work full-time and never did go back. Now, he was seven years older than me and he recognized what value school was, so he threatened to whip both me and the superintendent if, number one, I didn't go back if they'd let me and, number two, if they didn't let me go back. [laughter] So I finally went on back and very fortunately got on out.

Anyhow, there had developed somewhat of a deal between the 'haves' and 'have-nots', or the children of the 'haves' and the 'have-nots', so I had sort of, I reckon, developed a little inferiority complex. But my senior year in school, a few of the 'have-nots' got together and got a little tired of the 'haves' just running things, so we decided we were going to put up a slate of officers for the class, and somehow or another they selected me to be the candidate for president--and we won! I reckon that sort of proved to me, "Well, hey, I'm not so inferior after all." I think that was a good lesson for me.

The depression times were rough, but at the same time the majority of the people would help each other, and the pleasures of life were much simpler then than they are now, of course. I know one of our big family recreations on Sunday afternoon [was that] Mother would take my sister and me and we'd go walking out in the military park there in Vicksburg. We just explored that park from one end to the other and picked up artifacts, so I learned an awful lot of history through the process. So it was good times.

MR. PYLE: In interviewing different people across the state, I know in the more agricultural section of the state, people were able to supplement their diet by simply growing food. Likewise, down on the Coast they had what they called Biloxi bacon: it was the mullet that they'd go out and catch. It was no problem for a lot of different people to supplement their diet. How about [in] Vicksburg? What was the staple? What did you eat mostly?

MR. AUTER: Pancakes. [laughter]

MR. PYLE: Pancakes. They're filling!

MR. AUTER: They are filling, and they are filling and they are filling! At one stretch, at one particular time, I don't recall exactly when it was, but that's really all we had was just flour and water, and Mother made pancakes three times a day. That went on for a couple of months. I recall very vividly one day telling them, "Mother, I can't eat another pancake. I'll just starve." My sister was anemic and the doctor told Mother she was just going to have to have milk, so she was getting one pint of milk a day for my sister. Oh, I just longed to get some of that milk. [laughing] In fact, I hate to admit it, but just to give you an example--it's part of growing up--I actually found some people out of town one time and the milkman left milk on their back step and I went up and I swiped that milk. [Laughing]

MR. PYLE: You couldn't let it spoil! [Laughing]

MR. AUTER: Well, that's true, but that always haunted me after that, you know. I don't know whether the fear of

being caught, or shame, or what, but it sure was good. [Laughing]

MR. PYLE: Was that quest for milk part of the reason that you took up the work on the dairy?

MR. AUTER: Well, no--

MR. PYLE: Or did that just happen to come along?

MR. AUTER: It just happened to come along. But I tell you, when I did work in that dairy and had access to all that, man, I put on about thirty-five pounds real quick. [Laughter] My sister had started working there as a clerk and she helped get me started.

MR. AUTER: Through their food supplement program, the government brought in a lot of apples and they were available to people. Of course, they didn't have the deterrent[s] to spoilage like they do now, so quite often when they came in overripe and half rotten and bruised, and so you may have to waste a half or more of an apple to get good out of a part. But apples and potatoes and that type of thing [came] and so they were available.

My mother was a real proud woman. Some of this furniture you see here was hers. When my dad was working, river pilots made good money.

MR. PYLE: I see.

MR. AUTER: That desk and this loveseat over here and that clock on the mantle [were all hers], and she had silver and china and crystal, but she was so proud [that] she would not sell any of that in order to get money for food. Every time one of us was born, my dad gave her a new diamond, either earrings, or a stickpin, or ring, and she held onto those [and] would not get rid of them. He was a Mason and she was active in the Eastern Star and they had good friends; and some of them were much better off than we were.

I recall very vividly one night back when we were just scratching [out an existence], you know. A group of these folks came by and they came walking in the house with, as I recall, it must have been about ten large bags--not these little grocery sacks you carry today, but those old, long, tall ones. And they had about six or eight of those bags and a couple of boxes and they were just loaded with everything--apples and oranges and bananas and all sorts of staples. My mother--I can still see her today--with tears streaming down her eyes, would not take it.

MR. PYLE: Oh, is that right?

MR. AUTER: She would not take it.

MR. PYLE: I assume there were probably tears streaming down your eyes, too. [Laughter]

MR. AUTER: Well, I think I was mad. [laughter]

MR. PYLE: Yes.

MR. AUTER: She told them that there were a lot of people that needed it worse than we did, that she appreciated it, but [to] take it back.

EDITOR'S NOTE: At this point there was a brief interruption.

MR. AUTER: And I couldn't understand that at the time, but later on I understood why, but, boy, it hurt! [Laughing]

MR. PYLE: This reminds me of the people that were riding the rails back in those days that got labeled as hoboes. So many of them were people--not shiftless--out looking for work, bumming. They were people caught in circumstances like that, and they were very proud people.

EDITOR'S NOTE: At this point the quality of the recording deteriorates greatly.

MR. AUTER: Of course, you had both kinds. You had the hoboes who just wanted handouts and then the others who'd offer to work for whatever they could get. Once the word got around of an "easy touch", there would be a steady stream of people of both kinds. Our house was heated at that time by fireplaces or a coal stove, and so one of my occupations during the early years was going into the woods twelve blocks away and helping some of the men chop down trees and drag them home for fuel.

EDITOR'S NOTE: At this point there is an extensive inaudible portion.

MR. AUTER: Normally, we used coal to burn for heat and used natural gas only for cooking and heating water. Gas was too expensive to use for heating and then even the lower-priced coal became too high, so the only recourse was find wood and drag, it home. When I say, "drag," I mean literally [to] drag, since we didn't have a car, wagon, or any other type of wheeled vehicle.

Have you ever tried to chop down a locust tree? These things were like iron? And they had huge thorns on them like daggers? It didn't matter what kind of wood it was as long as it would burn. As the situation got a little better, we were able to put in gas plumbing and install space heaters and eliminate the fireplaces and pot-bellied stove altogether.

MR. PYLE: That must have been rough. Were you able to keep the whole house warm?

MR. AUTER: No. When it was cold we'd all stay in the one large bedroom. We had a nice house. But after my dad went in the hospital my mother split the house to take in roomers. We started out by renting out a room and then eventually wound up splitting off half the house and making it into an apartment. It stayed an apartment until she left the house in 1969.

MR. PYLE: She actually put up a partition?

MR. AUTER: Yes, and split the house in half; but both sides had to share the one bathroom. The additional income provided by the rental enabled us to live a little better than we had been, of course.

EDITOR'S NOTE: Most of side two of tape number one is inaudible due to mechanical malfunctions. The following one and a half pages are Mr. Auter's reconstruction of the conversation.

MR. PYLE: Did you ever get to make any trips with your father?

MR. AUTER: No, I was much too small for him to carry me along. I did ride the ferryboat he piloted from Vicksburg to Delta Point, Louisiana, and back several times, not only to have picnics across the river, but just to ride back and forth.

These boats were two-deck affairs with the lower deck used for cars and wagons, and the upper deck for passengers. This upper deck had a large hardwood-floored dance area and on Saturdays and Sundays a three- to five-piece band, generally [of] black jazz musicians, would play off and on all day and into the night. There was a snack bar aboard that sold soda pop (mostly "Nehi" in eight flavors), beer (10 cents a bottle), peanuts, [and so on]. I remember one of my favorite things to do was to get a Nehi strawberry pop, punch a hole through the cap with an icepick, hold my thumb over the hole while shaking the bottle and then, holding the top close to my open mouth, move my thumb and let the pressurized pop spew into my mouth. The carbonation would be sufficient for four or five good spurts. Then, when there was no more fizz, I'd pull the cap off and empty a nickle bag of salted peanuts into the remaining pop and then very slowly consume the mixture. Of course, there were some who had too much beer and got rowdy. Mother told me that several times Daddy had to intervene; quite often he offered them the choice of quieting down or else swimming the rest of the way.

MR. PYLE: What about your great-grandfather or grandfather? Did you know them or hear any of their river tales?

MR. AUTER: No, they both died long before I came along. My great-grandfather, Abraham Auter, was born in Ohio around 1800 and came to Vicksburg about 1821. He must have been quite a man. He had two wives and eighteen children, surviving all but four of them. He is reported to have made and lost several fortunes during his lifetime. That was easy to do in those days by building and operating boats. It was just as easy to lose it all when a hole was punched in the bottom by a "floater" log, or a "riser" log or when a boiler exploded. Abraham was reported to be the pilot of the first boatload of Indians relocated from Mississippi to Oklahoma. He also was supposedly the pilot of the first steamboat to navigate the Yazoo River.

One of his sons, Sid, is credited with piloting boats which ran the Union blockade of the Mississippi associated with the siege of Vicksburg. Another of his sons apparently piloted boats on the Sunflower and Yazoo rivers, and had a now-extinct post office or community named after him on the Sunflower several miles north of Louise, Mississippi. One of my uncles relayed a story about one of Abraham's boats before the use of steam engines. This particular type boat was a large open boat propelled by a paddlewheel mounted on each side. Normally, each paddlewheel was turned by a shaft which was geared to twenty handcranks, each manually turned by an Irishman, so there were normally forty men required to propel the boat upstream, fewer downstream. The crew was required to crank for thirty minutes and be relieved by a second crew of forty while they rested for thirty minutes. Since this was during the period when slavery was happening, one might think that black slaves could have been used for this grueling task. That wasn't the case, however, since there were so many unemployed Irish immigrants available and slaves apparently were considered more valuable for work in the fields than on the river. As part of this same story, my uncle related that there was never a trip completed without one or more fights between the high-tempered, hot-blooded Irish crewmen. Whenever there was a disagreement, the captain steered the boat to shore, everyone got off, and the fracas began and kept going until everyone was satisfied, then they reboarded and kept going.

MR. PYLE: I imagine river piloting was a lot different then than it is now.

MR. AUTER: I'm sure it was. One of the big differences, of course, is that today's navigational aids and communications are much better. Also, of course, the boats are more powerful, safer, and better maintained.

I've heard my mother talk about the size of the tows (number of barges) that my dad pushed, and I'm sure she said twenty to thirty barges was a normal tow, but that it had gone as high as sixty. In all likelihood, the barges of that day were much smaller than today's barge ones. In any event, it was not unusual for tows to be one hundred feet wide and a quarter mile long when traversing the larger rivers like the Mississippi and Ohio.

What has not changed, though, is the continual changes in the river beds and obstructions that occur from day to day. So today, and in yesteryears, river pilots had to learn by experience to spot hazards in time to avoid them. Sometimes, sandbars would develop out in the river practically overnight. Then you'd have whirlpools. So they had to be real experienced in looking [by] the eye and, really, driving by the seat of their pants like the old air pilots of the old days.

MR. PYLE: The way you describe it, it becomes more adventuresome than I would have imagined.

MR. AUTER: Yes, it's interesting. I've got a picture of the old paddlewheeler, Mississippi, which was a government boat. One of the few occasions that I can remember being with my dad was on Sunday when the officers could invite their families down for dinner. I always looked forward to that because they'd have several of the big black deck hands out there turning the freezers of ice cream. Boy, I always looked forward to that because that homemade ice cream was out of this world!

EDITOR'S NOTE: At this point there is another inaudible portion. The following three pages are Mr. Auter's reconstruction of the conversation.

MR. PYLE: Maybe that memory is what steered you towards working for the dairy later!

MR. AUTER: Maybe so. God has always seemed to steer me towards good things all my life. Looking back now, it amazes me that whenever there was a crossroads in my life, He pushed in the direction that appeared to be right for me.

MR. PYLE: Tell me a little more about your early life such as hobbies, school interests, sports and so forth.

MR. AUTER: Well, since I was working after school from the seventh grade up, there really wasn't much opportunity to engage in sports at school. My sports career was limited to neighborhood activity during the summer mornings, so I never really developed skill in, nor a great infatuation with, any of the usual sports either as a participant or a spectator. Even in college I hardly ever saw a campus game because I was working selling soft drinks, parking cars or directing traffic. I did and still do, however, enjoy playing baseball, softball and tennis.

As far as hobbies, I reckon collecting things was my thing. I collected most everything. I had the biggest and best collection of empty cigar boxes in Vicksburg. Back then, cigars came in all sizes, both [in] diameter and [in] length. The better ones came packed in very nice boxes made of thin exotic woods from foreign countries and were very well-constructed. Cheaper cigars were packed in cardboard boxes covered with slick paper. The wooden boxes were nice enough for people to use for many purposes in their homes such as jewelry boxes, small planters [and so on].

At my peak, I must have had close to three thousand boxes. Do you have any idea how much space three thousand boxes take? Fortunately, we had an old carriage garage in our backyard which held my collection for a couple of years, but it had to finally be torn down before it fell down. At that time, Mother wanted me to dispose of

the boxes, but I just couldn't bear that, so up in our attic they went. Now, we didn't have a nice stairway into the attic, only a small trapdoor in the ceiling of our bathroom. Neither was the attic floored, so I had to haul up enough lumber to stack the boxes on. I didn't realize at the time what a great fire hazard I was creating. My only concern was saving my collection for posterity! It wasn't long, however, before some well-meaning friend advised my mother to clear the attic and I got the ultimatum. So with tears in my eyes and great misgivings, I retained the better wooden boxes and gave all the rest to my friends who were collectors. Would you believe, I still have a few of those boxes back in my shop!

Another collection that I had was [of] Civil War artifacts found out in the National Military Park which surrounds Vicksburg. These were mostly mine balls of several sizes and shapes, pieces of shrapnel, cannon balls (some of which still had powder in them), uniform buttons, bayonet pieces [and so on].

I'll also have to admit that there were one or two pieces which I illegally removed from some of the old cannons which were on display in the park. The whole time I had these particular pieces, however, I couldn't show them to anybody since I was in mortal fear that the park rangers were going to hear about them and come cart me off to jail. I couldn't stand the pressure but about a month, so late one night I sneaked back out there and replaced them. Believe me, I learned a good lesson from that episode! Most of my collection has gotten away through the years and I only have two or three pieces left.

Another collection which my mother took a very dim view of was my oil can collection. This didn't last too long because when the old garage went, so did they.

My bottle-cap collection was, of course, much easier to keep for a while since the caps were relatively small compared to cigar boxes and oil cans. All soda-pop and beer was sold in slender-necked glass bottles in those days, and the tin-plated steel caps each had small cork inserts to seal the bottle when the metal caps were crimped onto the top of the bottle. Since people didn't travel near as much then as we do now, caps of local brands from distant areas were treasured items. In addition to saving and displaying a small number of each type or brand of cap, we would gather as many caps as we could and use them to make various household and entertainment items. I reckon there were as many checker games using bottle caps for checkers as there were using regular black and red wooden checkers. With bottle caps, one player would use his caps corkside up and his opponent would have his corkside down. The stacked very easily whenever a player made his "king".

The most common use of old caps was to make pieces of furniture from strings of caps. These strings of caps could be made as long or as short as desired, bent into curved shapes, connected together by making hooks in the wire at each end of the string, and as limber or as stiff as needed by using the right size wire in the middle. To make a string, all one had to do was punch holes in the center of the caps with an icepick and push the steel wire through the hole, stacking one cap to top another until you had the desired length of string. Many different types of useful articles were made from them such as hanging or stationary flowerpot holders, coffee tables, ashtray stands, planters [and so on]. Usually after the article was fully assembled, it would be painted. They were cheap, kept people busy during the depression years and were very useful articles. I've already mentioned the recreational use of bottle caps as the ball in our stopper-ball games.

My other collection, which I prized the most, and which was the most beneficial to me was, and is, my stamp collection. Unfortunately, I did not actively keep it up after I finished high school. My mother actually got me started collecting stamps. She worked for a short while during 1935 for the WPA helping to sort through old records in the Old Court House in Vicksburg prior to transferring all offices and necessary official records to the newly built Warren County Courthouse. Since the Old Court House had been in operation since being built by slave labor prior

to the Civil War, there were huge piles of old envelopes and outdated records to be discarded. She started retrieving and bringing home any of those having stamps, both postage and documentary. While none of them were of any great monetary value, they were of great interest to me and got me started.

It's amazing how much one learns while collecting stamps. It exposes you to portions of history, geography, geology, botany, agriculture, art, literature, humanities, sociology, government, economics, language and so on. Philately expands your circle of acquaintances and friends, because it is through them that you acquire most of your collection. Since I was unable to buy many stamps, I relied on people sending them to me free or swapping. My best scheme for getting foreign stamps was to write the U.S. Consul Generals in each U.S. consulate throughout the world, request[ing] them to send me stamps from the countries in which they were located. Those people were great! At that time, U.S. postage was three cents and foreign mail only cost five cents. I had a steady stream of official-looking letters coming to my house in Vicksburg from all over the world! Our postman soon began to look forward to those letters as much as I did and he quite often wanted me to open the letters as soon as he delivered them so that he could see what had been sent me. In addition, a large number of young people like myself were pen pals and swapped stamps of [other] countries.

But like I said, I went inactive after high school. Since then, whenever I have seen any interesting stamps, I have thrown them into a large box. Maybe some day I'll get back in. My collection is still packed away in a wooden chest that I put it in in 1943 before I left for the army. Maybe someday one of my grandchildren will get the urge to collect and he, or she, will have a pretty good start with Grandpa's collection.

MR. PYLE: Well, those are quite some different kinds of hobbies. Let me ask you about how you and other young people were affected by, or felt about, the war in Europe and later World War II. Let's see, in 1937 you were about thirteen years old and in the seventh grade.

MR. AUTER: Well, I was thirteen, but starting the ninth grade in September of that year. I don't recall that there was any real direct impact until about 1939 when Germany attacked the European Low Countries. Up until then we would see reports in the newspapers, the movie newsreels and radio newscasts, but it didn't make too much impression on us youngsters. As time went by, however, and we got a little older, and particularly when England and France got into the war, it became evident that things were getting rough for people in this country also. The armed forces were building up and constructing new camps and stations, particularly in the southern part of the country. A large number of servicemen from European countries that had been overrun were coming to this country for training. Local National Guard and reserve units were recruiting people. Sales of U.S. Defense Savings Stamps and bonds were started and promoted. Defense Training Courses were started in local communities to build up skill levels of people in defense and military skills such as radio operation and repair, electricity, carpentry, welding [and so on].

The Selective Service system got busy registering young people for the draft. Of course, the movies playing at local theaters became war movies more and more to stimulate interest and concern of the people. It was probably in 1939 that we saw young men from our communities volunteering to serve in volunteer units with the English.

Vicksburg had been for years the headquarters of several elements of the U.S. Army Corps of Engineers concerned with civil works in that area. They were the Mississippi River Commission, the Lower Mississippi Valley Division, and the Vicksburg District. While there always were several regular army engineer officers assigned to those organizations, many more of the civilian engineers and other personnel working in them held reserve commissions. It seems like one day they were civilians and the next they started wearing their uniforms to work. This really made an impression since they were parents of many of our classmates. It wasn't long before they were reassigned to active-duty stations throughout the country.

Then in 1940, young people started getting drafted "for a year", National Guard units mobilized "for a year" and people started joining the Merchant Marine to help carry supplies to Europe. Even so, the war was, I think, for people my age–

MR. PYLE: For a fellow of sixteen, [that was] kind of interesting.

MR. AUTER: No, not really. I think for people my age and for a lot of people in the country, really, the war was "over there". A lot of the young men in that year had gone in the National Guard or had registered for the draft. Many of us younger high-schoolers were used in registering people. Then, a lot of seventeen-year-olds volunteered for that one year of active service and they were supposed to get out after that one year, and then Pearl Harbor caught a lot of them in the middle. But, as I recall, the war was a distant thing to most of us. At Mississippi State in December of 1941, there wasn't a great deal of concern evident to me. Then, on the seventh came the announcement, and the immediate reaction up there was, "Oh, well, we'll whip those yellow bellies in two weeks!", but it didn't turn out that way.

MR. PYLE: [That] is true.

We work on many different series of interviews often at the same time. One of them that we are doing is with Mississippi prisoners of war in World War II, Korea, and Vietnam. I had the opportunity to do a POW interview last week down in Bay Saint Louis with a gentleman who for four years was a POW in the Philippines with Japan--and you're right. That's the exact reaction they had, that we'll whip these silly Japs in two weeks; and then five years later it was still going on: it dampened a lot of spirits. Up at Mississippi State now, there was a pretty active ROTC program up there, was there not, during the early years of World War II?

MR. AUTER: Oh, yes. Of course, everybody who went to State, unless you were physically unable, had to take the first two years of basic.

MR. PYLE: Okay, that's right.

MR. AUTER: That was required, but the advanced was optional, volunteer.

MR. PYLE: Was there much war hysteria at Mississippi State? Did a lot of the students join after Pearl Harbor?

MR. AUTER: Oh, yes. There were some that just took off immediately and volunteered. Then they also started several different kinds of reserve programs: you could join the Navy V-12 or the V-5 program or you could join the Army Reserve program. Then they'd let you go on to school and get your degree--that was the aim--and then you'd go on active duty. Some of the programs were, "Hey, you go ahead and join, go get your basic training," and then they send you back to school and they pay your way and everything. The navy particular[ly] had that latter program very firm, and so they got an awful lot of their officers that way. Then they'd let quite a few of those that were in the upper classes go on to OCS [Officers' Candidate School] without the degree and get a commission. But then shortly after that--oh, it must have been sometime in 1942--of course, the enrollment at State and all the other colleges just went "ffft", down. And at that time, State only had about one hundred coeds; there were very few females attending State. More females started showing up on campus and then they started setting up the various OCS's at State and a lot of the other universities. State set up the Transportation Corps Officer Candidate School. Then they had what they called the Air Corps Pre-preflight School where they would bring young men in for basic flight training and

then they'd go on somewhere else for their preflight training and then for flight training. So during the fall of 1942 and 1943 while I was there, the place was just crawling with uniforms. In fact, Howard Cosell, I understand, went to OCS at State during that period.

MR. PYLE: Is that right?

MR. AUTER: I heard him mention that on Monday-night football a couple of weeks ago.

MR. PYLE: It's pretty well known that Johnny Carson was at Millsaps during World War II, but I didn't realize about Howard Cosell, though.

MR. AUTER: Yes. Somebody said something about Mississippi State--one of the players was from Mississippi State-- and one of the commentators said, "Where's that?", and Cosell said, "I can tell you where that is. I went to OCS there." [laughing]

MR. PYLE: That sounds like Howard Cosell: "I know exactly where it [is]."

MR. AUTER: [During] my first two years while I was at State, I had borrowed my matriculation fee from the man I had worked for in Vicksburg, Mr. Henry Allen [of] Allen's Dairy. I borrowed that money from him, and at that time it was about a hundred and fifty or a hundred and sixty dollars a semester. When I first entered, I worked for what was called the National Youth Administration, the NYA. That [job] would pay you fifty-five cents an hour and you could work a maximum of twenty hours a month cleaning up, raking leaves, cutting down trees or hauling garbage or whatever. But then I got a job in the Dairy Products Building and you'd work enough to where you'd make about $1.35 or $1.50 a day, and that was enough to buy your food. Then I went to work as a waiter in what was called the Grill. Every once in a while some of the 'haves' would tip you a dime, but then when the military came in, well, they set up an officer's mess. Two other guys and I were given the opportunity to just handle that officer's mess, so we ate like kings. We ate what they did, and then they'd take up a collection every week and we'd split it among the three of us, so we'd clear five or six bucks apiece cash plus eating like mad? [laughter]

MR. PYLE: Yes. That's the first time I have ever heard of voluntary KP. [laughter]

MR. AUTER: Oh, I did that a couple of times while I was in the service while I was awaiting assignment. The other option was to be put on a post garbage detail or over in the laundry or somewhere else. This way you'd work along with some civilians over there and eat like mad, you know, plus get some extra cash. Then when I was at Purdue, I worked extra in the bowling alley spotting pins. Let's see, getting back to that financing deal: at that time at State they had a regulation that if you cut a class two days before or two days after a scheduled holiday, or if you had three unexcused tardies--let's see, three tardies made one cut, three cuts of a class, or an absence two days before or two days after a scheduled holiday, was a letter-grade cut in your subject.

MR. PYLE: That was a little more stringent then than it is now.

MR. AUTER: It sure is. So in the fall semester of 1941 and the fall semester of 1942 I had negotiated for and gotten employment at the Post Office department at Vicksburg as an extra carrier. At that time they were paying $1.05 an hour and you could work about a hundred and twenty hours during the holidays. So with some overtime and so forth a kid could make almost enough during the Christmas holidays to pay your matriculation the spring semester. But the only thing was that you had to report for work on a certain day and you couldn't be late, and that day happened to

be the day before the scheduled holiday at State. So, even though I pleaded with the president--Humphries at that time--to waive that regulation he wouldn't waive it and so a couple of other guys and I took a letter-grade cut in every subject both fall semesters to enable us to get home in time to get that job to make the money so we could come back the following semester, you know. So my college transcript looked pretty poor those two semesters [laughter]--one letter-grade cut across the board!

MR. PYLE: It beats not going back to school, I guess.

MR. AUTER: Oh, yes. As it turned out then, I was able to pretty well put myself through school with the exception of borrowing the money for those first two semesters. Then I went on into the service and when I got out, they gave us three hundred dollars mustering-out pay. I think I owed Mr. Allen about $287 or something like that, not including interest. And he didn't charge me interest, so I took my mustering-out pay and paid him off.

MR. PYLE: I was going to ask--and you have pretty well covered it now--how you went to school with your father having passed away and not having a lot of money accumulated, but you pretty well answered that: you worked your way through.

MR. AUTER: Well, I worked my way through; it could be done. Scholastically, I didn't set the woods on fire, but I think I learned a lot more than a lot of folks that didn't have to work for it. After the war, it was lots easier because I did have the GI bill: that really helped out. Then when I joined the advanced ROTC, that paid you an extra amount; that paid you about fifteen dollars a month cash, so we did all right.

MR. PYLE: What was the stimulus in going to Mississippi State in engineering? What made you choose engineering?

MR. AUTER: Well, I don't really know.

MR. PYLE: It was something that wasn't in the family previously.

MR. AUTER: This man that I worked for, Mr. Allen, was a graduate, an electrical engineer. He graduated from Cornell University, but he never practiced engineering because his father had the dairy south of Vicksburg. When he finished college he came on back and went to work with his father. What I really had planned to do and had looked into since I had worked for him for four years and he did not have a son--he had a daughter--I was sort of looking ahead and thinking, "Hey, maybe the old man would consider me working for him in the dairy here," you know, so I was seriously considering taking animal husbandry and I went up to State fully intending to register in animal husbandry. But I think on the ride up with some of my friends--we got up there and they were going into engineering and I like things mechanical and whatever, [so] I said, "Heck, Mr. Allen was an electrical engineer [laughter], so why not [sign up for engineering]?"

MR. PYLE: It worked out well for him. [Laughing]

MR. AUTER: So I went ahead and signed up for engineering. I wasn't unhappy about it at all. I think that's what I was destined to be.

MR. PYLE: You mentioned your military experience--and that's a fairly enviable record, I guess, being in both World War II and Korea and not having to [be involved in combat]--although at the end of World War II you were in

a military theater over in the Pacific theater, although not directly in action.

MR. AUTER: No, I never got shot at by the enemy. [laughing]

MR. PYLE: That's what I was meaning [by] an enviable record. [Laughter] What was your experience during the war? You mentioned the training and such. Getting ready for the invasion of Japan, that would make a number of people kind of uptight, as they say.

MR. AUTER: Well, of course, we didn't recognize at the time that that's what we were destined to do.

MR. PYLE: Oh, I see.

MR. AUTER: And the only reason that we know that or came to find out that is that the former commanding officer of the 1299th Battalion at Camp Bowie left us after I had been there about six months. We'd gone through advanced basic and then advanced unit training and [had] gone through three or four cycles of training. He was reassigned and he went to the Pacific Headquarters staff, and then after we got to Sendai, Japan, he came by and visited us one day to see his old outfit. He told some of the officers at that time and showed them exactly what had been our planned role in that. We were supposed to be in the third wave [to] come in about the central part of Honshu, the main island. So we did have the opportunity to get over there and see that beach we were supposed to have come in on. [laughing] We all agreed that we probably never would have made it. [laughing] The third wave is not the best wave to come in on in an invasion because generally the enemy will let the first wave come on in and start clogging up the beach a little bit and then the second and third waves just really get the defense.

MR. PYLE: I see.

MR. AUTER: But we were supposed to follow two waves of Marines in. We were combat engineers, so we were supposed to be getting on up in there and building bridges and–

MR. PYLE: . . . Kind of hoping the marines would clear your track.

MR. AUTER: That's the theory, but fortunately it wasn't required. As it turned out, there appeared to be--if there had been an invasion of Japan--that the way the strategic bombing had been carried out, that a lot of the guns would not have the right kind of ammunition and they would be missing something or some real critical part. That's a real interesting story that I'd like to really look into one day, that strategy that was used. When they bombed Japan, they never bombed the rail centers: they didn't destroy them. They would just keep hitting a railbed, and overnight or two days later the Japs would have it repaired [and] back [in service]. But we Americans knew good and well if we ever got on the island we were going to need those rail centers and those bridges across ravines as much as they needed them, so we didn't want to knock them out.

MR. PYLE: It's a shame they didn't plan the strategy as well for the Normandy invasion. Perhaps it would have come off a little smoother.

MR. AUTER: Well, yes, but that's an interesting story, too. The Germans were really expecting the main thrust to be at Calais, but that was a tricky deal over there. I think we came out better than we should have, really.

MR. PYLE: Oh, is that right?

MR. AUTER: Yes. The circumstances were such that the Germans were prepared, but they were prepared in the wrong place. And a lot of that was due to some very adept 'mickey-mousing' on our part. They had a dummy invasion fleet set up so that the German spies and agents would see it and the German aircraft would spot it, and so they had most of their strength for the first two days up there at Calais. And had they not done that–

MR. PYLE: It could have been a lot worse.

MR. AUTER: Oh, yes. It sure could.

MR. PYLE: What were your impressions of Japan when you first got over there? What did it look like to you?

MR. AUTER: It looked like an island of males. The first couple of days, you didn't see a female. They'd all been sent to the hills because the propaganda that had been put out was the Americans were going to come in and just rape all the women and so forth. Our introduction to Japan, incidentally, was when we moved from the Philippines up [to Japan]; we went through the outer edges of a typhoon, and you are talking about a glorious ride on an LST [Landing Ship Tank] in a typhoon, particularly after the mine sweepers had been up in Tokyo Bay cutting the mines and letting a few of them get loose from them. Then, with the large steel pontoons, or these barges, that are lashed on the side of the LST, a couple of them breaking loose and floating through the convoy battling twenty- and thirty- and fifty-foot waves, and a lot of engineering equipment down on the tank deck and on the top deck and a chain breaking every now and then--

MR. PYLE: Oh, yes. It's one of those situations similar to where your LST was to land about the middle of Honshu. [Laughter]

MR. AUTER: Any land would have looked good after that trip! [Laughter] It wasn't a question of whether that ship was going to break in two and sink, it was just [a question of] when, you know.

Japan was an interesting place compared to the Philippines--it was much cleaner. The people are naturally a very clean people. They don't look clean, but they are clean. Everything was highly organized and all the workers were more or less unionized and generally wore uniforms: the railroad workers wore blue uniforms, all of them the same. Very antiquated methods and techniques were being used at that time. They did by manpower what we did by machine power, and some of our equipment that we brought in just amazed some of those people: they'd just throng around and look at it.

EDITOR'S NOTE: At this point there was a brief interruption.

MR. AUTER: A chain saw at that time cutting through twelve-by-twelve timber to make chocks for a railroad just fascinated them. When a rail car would jump the rails they would get it back on by going and getting some large poles and setting up a gin-pole arrangement with a couple of simple pulleys, and [it took] about two hundred men just to lift that rascal and set it back on. Well, one day as we were loading our stuff down below Tokyo to move up and open up the island to Sendai, one of the flat cars jumped the track and so we just called for our wrecker to come down and they wheeled up and threw his hook on and [Mr. Auter whistles, indicating the ease of the operation] set her back on the track, you know, and they just stood there open-mouthed.

One of my jobs was to rewire a school. We were quartered in an old high-school building and all the electrical wiring had been stripped out to use in factories and whatever, so one of my first jobs was to put in lights. I only had a limited amount of equipment, so I had to go down and negotiate with the local head of the power company to get some wire and sockets and other fittings. They were very nice and insisted that I have tea--it was unsweetened, I wasn't used to unsweetened tea--but I went through the ritual, and they were very cordial and I got what I needed, but the fuses [were a bit unusual]. They fused everything: there were fuses in the socket and they had a fuse in the switch and they had had fuse[s] back at the branch. In many cases, they don't have different size fuses, they just have one size of fuse wire. If you wanted it five amps, well, you'd take your diagonal pliers and you'd cut out a hole that much. If you wanted ten amps you'd cut out a little less [laughter-but it was interesting.

It is a pretty land. It's very hilly up on Honshu, and I only got on Honshu, the main island. [It's] very mountainous up in the northern part.

MR. PYLE: I was wondering how you were received by the Japanese after Hiroshima and Nagasaki.

MR. AUTER: My impression was that by the time we got there the Japanese people were tired of war and they were tired of the deprivation that it had created. To my knowledge, there was no incidence of resentment or whatever. Very few of them really welcomed us with open arms, naturally, and some of the former military types, some of the ex-soldiers, were very sullen and wouldn't have anything to do with us, but by and large the majority of the people accepted the fact that they had lost the war; they wanted to get on with life and get back on their feet, so there wasn't any real problem. At the same time, I think, you have to recognize probably one big factor is that starting with MacArthur the policy was, "Hey, these are proud people, they have their customs; they have lost the war [but] don't rub their noses in it." By MacArthur letting the emperor stay in his palace [and] maintain his prestige and all this good stuff, the task of the Army of Occupation was greatly eased.

MR. PYLE: Was there a difference in the way you were accepted by Japanese civilians and former military?

MR. AUTER: No, I don't think there was an awful lot of difference, really, because practically all of the people in Japan, whether they were civilians or military, were part of the war effort and they had a tremendous amount of residential industry, if I can express it that way. Every house produced something for the war effort. It may be just assembling a switch, or a piece of a switch, and then that would be moved to somebody else's house and something else would be put together with it, as opposed to having things concentrated in factories. [For] a lot of the Japanese industry, as I understood it, that was true even before the war, you know, for toys and this type of stuff. And it makes a lot of sense. That's why it could be produced so cheaply, because you didn't have a big capital investment in a lot of factories, you know. And it worked real well.

On the strategic bombing deal, we visited several plants that had been bombed out and there were residential populations very close to them, all around the plant. We saw very little bomb destruction in the residential areas. It was all concentrated right there on the factory. And going through the factory [laughter], I took particular attention at a lot of the machine tools and so forth. Here was a machine tool, it had a forty-horse[power] motor on it, a Westinghouse. Over here [was] a twenty-five horse motor, a General Electric, and over here, an Allis-Chalmers--a lot of American equipment. You looked at another machine tool over there [with a] forty-horse motor and there was a Japanese nameplate on it. You looked at those two things and you couldn't tell them apart because the Japanese did do a lot of pirating of American-patented [machinery] in times past, and they were very good at it.

But the people generally were friendly. They weren't unfriendly, let me put it that way.

MR. PYLE: Yes.

MR. AUTER: I know after I left, [and] as more time went by, there was less resentment harbored. We were not down by places that really got beat up, so chances are that there was more in other places. Tokyo itself was [hit, but] one thing our pilots were told, "Don't bomb the palace. Stay away from that palace, now." But Tokyo was hit in a lot of places. But Hiroshima, I'm sure that down in that area [there was] lots more resentment, but up where we were there wasn't.

MR. PYLE: You never had the opportunity to see [the destruction at] Nagasaki or Hiroshima?

MR. AUTER: That's right.

MR. PYLE: This POW that I mentioned to you, that I interviewed down in Bay Saint Louis, he, after they were freed from the prison camps, they were put on a train, and the train went right past Nagasaki--or Hiroshima, I'm not sure--but there the military and civilian leaders, the allies, seemed to be completely unaware of the radiation, that there was that sort of thing that was being emitted from there.

EDITOR'S NOTE: At this point there was a brief interruption and a mechanical malfunction rendered a portion of the interview inaudible. The material between this editor's note and the next represents Mr. Auter's reconstruction of the conversation.

MR. PYLE: Let's move up in time to the present. You mentioned before we began that you and your wife own and operate a local bookstore. How did you get involved in it and isn't it quite a change of pace from your work with NASA?

MR. AUTER: Yes, it is quite a change, but it has been a most rewarding experience for both of us. In early 1977 I began to plan for my retirement in 1980 or 1981 and was searching for some small business to start or buy so that by the time I did retire I would have it built up sufficiently to 24 work it fulltime as a second career. Our youngest child, Amy, was to finish high school that year and my wife would be the only one at home for the first time in over twenty years, so she was interested in activity outside the home also. We checked out several opportunities before we lucked up on the bookstore, which was three years old at the time. During our lunch break I'll run you to the store and show it, as well as some of Picayune, to you.

EDITOR'S NOTE: At this point there was an interruption in the interview.

MR. PYLE: We've been talking about the different programs that you have been working on [and the] different rockets with which you have been associated: what were the circumstances of your move down here to Mississippi from Redstone Arsenal?

MR. AUTER: Well, with the establishment of the new static test facility, the Mississippi Test Facility, in Hancock County, of course, they had to have a staff, so since I had been in Huntsville in the test business for quite some time, they asked me if I would be the deputy manager. They had selected a Captain William Fortune, a retired navy captain, to be the initial manager, so he came on down in 1963 and helped do a lot of the public-relations-type work involved in setting up a facility of this type. There were a total of 141,000 acres of land that had to be acquired, some of it from large companies and some of it from individuals. Some of it was going to be purchased in fee simple and

some was going to have an easement put on it. Consequently, there was a lot of dissatisfaction on the part of families who were going to be put in the posture of having to relocate out of the area, so Senator Stennis was called on to come down and help quell [the anger of] the local populace at a meeting, and Captain Fortune was very good in the community-relations aspect.

We put together an initial team of specialists in mechanical, aeronautical, electrical and electronic testing. Of course, the major part of the work was to be done by the contractor who actually built these stages and these engines. The job with NASA was one of insuring, number one, that the facility was built and, [number] two, that the specifications of NASA were met by the contractors selling this hardware to the government. Construction started at the site, and on May 17, 1963 the first tree was felled. Then it took about two and a half years before the first test could be run on one of the large test stands. All together there were some 268 million dollars of 1964 or 1965 dollars–

MR. PYLE: Considerably more in today's dollars! [laughing]

MR. AUTER: Yes, right--put into brick and mortar in the various structures--the buildings and roads and railroads and a canal system--that went to the base of each test stand.

MR. PYLE: The canal systems?

MR. AUTER: Yes, there is an on-site canal system. These large stages for the Saturn V vehicle were twenty-eight feet in diameter, so it was much too large to transport over the highway or over the railroad and you couldn't fly them; so the only way to transport them from the West Coast to Mississippi and [from] here to the Cape [Canaveral, or Kennedy, the launch site], was by water. So we had a barge system, both for river barges and for ocean-going barges that would transport these vehicles. The test site, being 25 located inland from the Gulf, was accessed by coming up the East Pearl River from the intracoastal waterways. Then we had to put in a lock on-site, which was as large as one of the locks in the Panama Canal, and it actually lifts from the level of the East Pearl River up to the level of the site, so the normal lift was about thirteen feet, the maximum about twenty. The lock was 660 feet long between gates and 110 feet wide, so it would take anything the Panama Canal did, but the depth was much less.

MR. PYLE: Yes.

MR. AUTER: In addition to bringing the stages in that way, the large quantities of liquid oxygen and liquid hydrogen that are used for propellants were brought in by barge. Instead of having large tanks at each test stand to hold this stuff, we used the barges not only to transport the product from the plant in New Orleans to the site, but also used [them] right at the test stand to fill the vehicles from there, so it saved the government some money.

MR. PYLE: Yes.

MR. AUTER: Most of that land down there was owned by International Paper [Company] and L.O. Crosby interests, but there were, I believe, some 180 families--186 to be exact--that had to relocate from that area in Hancock County--a couple of cemeteries had to be relocated--and they were paid pretty well for their homesites. But the majority of the land, some 120,000 acres, was not purchased in fee simple, but a restrictive easement only was acquired to prohibit human habitation. This land was about five miles deep all around the outside [of] the operational area; that gives a buffer between the residents, or business of someone, and this high-noise-generating test [facility]. That is a pretty good buffer to make sure that our static test schedule is not inhibited by the closeness

of someone. At the same time, that is far enough away that it really doesn't give them any problems normally--sometimes it could.

So we came down and built the facility. At its peak NASA had about 120 employees here, and contractors had close to 3800 employees. And I was the deputy manager and also the head of the technical element of our group that oversaw the conduct of the test program for the stage acceptance testing.

MR. PYLE: Let me ask you one background question here concerning the test facility. Being from Mississippi, it was just fortuitous that you were able to come back this close to home, but how was it that the test facility site was located in Hancock County? What different elements go into making up the necessities for a test site?

MR. AUTER: Well, there were some thirty-six sites surveyed by the site selection committee. Some of the prime requirements were that you needed proximity to deep water transportation; you needed proximity to a source of the production of liquid hydrogen and liquid oxygen; you needed a place close to a good-sized metropolitan area to support the activity businesswise and technically; and you also wanted to have a pretty good educational plant within the commuting area. Generally speaking, they wanted to locate this particular test facility somewhere in the southeastern part of the country because of [its location] in between Houston, Cape Canaveral and Huntsville, since this is where the most aspects of the manned space program were centered, so Southern Mississippi [was chosen]. Well, I reckon another thing was the availability of a large area of land at reasonable cost; 141,000 acres of land in one chunk is pretty hard to come by in a lot of locations. [laughing]

MR. PYLE: Exactly. Were there any political considerations?

MR. AUTER: I wouldn't [say so].

MR. PYLE: They seem to invade everything to some extent, that's why I ask.

MR. AUTER: Yes. Of course, there was political concern. There were several states that would have liked to have gotten it, but I don't think that political consideration was the foremost [issue]. Senator Stennis, of course, was the top politician available at that time--Senator Eastland was there also--but since this was not a military installation, John Stennis, position on the Armed Service Committee did not necessarily play a big part.

MR. PYLE: Okay.

MR. AUTER: I would think the natural attributes of the area, plus its proximity to New Orleans, the proximity to the intracoastal canal and, hence, the Gulf of Mexico, and the relative availability of land--recognizing a good part of that buffer zone is owned by International Paper and L.O. Crosby, who's got it leased out to somebody, therefore meant that you were not denying the use of that land to anybody, since the growing of trees just continues to happen, you know--so all those things put together, I think, said, Mississippi is a good spot.

MR. PYLE: Okay.

MR. AUTER: So we got the initial facilities built and we started our test program. We did acceptance-test the last twelve of the fifteen Saturn V first stages called the S-1C and all fifteen of the Saturn V second stages, which was called the S-2. I'm happy to say that all the stages that were processed through the then-called Mississippi Test Facility performed perfectly during their mission. While we had some difficulties on the test stand from time to time,

every one of the flight vehicles did their job like they were supposed to.

Then in 1970--October 31, 1970--was the last static firing of the Saturn V stage. There was nothing else immediately to follow, so the test facility went into a down mode phase. It was recognized that that was too good a facility and there would be too much of an impact [on] the communities around here to suddenly go from a three-thousand-plus employee level down to a caretaker's mode of about thirty-five people, so the NASA management at the site, including the successor to Captain Fortune, Mr. Jackson Balch, and his staff, started working hard to try to get other agencies, both federal and state, into making use of the facility in a meaningful way. National concern at that time was [turning] to the environment, [so] we tried to talk the Navy into relocating a good part of their oceanographic activity at the site. That wasn't timely at that point in time, but we were successful in attracting small elements of a considerable number of different agencies to locate activity and projects at the site. We turned the corner on the employment level at about eight hundred and sixty minimum--that's the lowest it got--then for the next several years it slowly and surely kept creeping upward. Then finally in 1975, the navy people were successful in convincing their bosses that it would be good for the Navy's oceanographic program if they could consolidate all of their many disparate activities scattered all over and around Washington into one location down in Mississippi. So the Navy Oceanographic Office and the Naval Ocean Research and Development Activity relocated to the site beginning in 1975.

Almost concurrent with that, then, our work with the army in making use of some seven thousand acres of undeveloped land within the operational area started bearing fruit. The army needed a new consolidated ammunition plant. There had not been a new ammunition plant built in this country since before World War II. Most of the plants scattered around the country were outmoded, outdated [and] unsafe; stuff was having to be train shipped all over the country--transportation costs were high, energy consumption was too high--so therefore the Army got approval for a new plant, which is now in the process of being constructed in the northern part of the operational area of the National Space Technology Laboratory, [which is] the new name of Mississippi Test Facility. It is being built under the supervision of and will be operated by the Mason-Chamberlain Company, a joint venture between Silas Mason and Chamberlain Manufacturing Company. It will employ on a single shift some fifteen hundred people, and in the event of an emergency it will employ up to forty-five hundred.

MR. PYLE: When is its target date of completion?

MR. AUTER: The first element of the plant should be complete this fall structure-wise, and [it will] probably go into operation [in the] early summer next year. There are three major elements of that plant, but the first one should be done [soon]. The total project is scheduled to be completed in 1983. So with NASA's space program, the Navy oceanographic activity and all the other elements of other agencies that are there today, I think today's on-site permanent population must be around thirty-five hundred.

MR. PYLE: Outstanding.

MR. AUTER: By 1983 it ought to be around forty-six hundred. I think one of the important things is that all of the capital investment that was put in in 1963 to 1965 is being used; there has been more investment put in by the navy, and certainly by the Army, and there is a diversity of activity there such that if there is a cutback in a program of any one agency, it won't mean the total thing goes down, so therefore the community impact is lessened.

The educational requirements and the educational capability of the place have grown tremendously. During the 1960's we had one Ph.D. working on the site and he was not working in his discipline. Today, there must be right

at a hundred Ph.D.'s in just about every field that you can imagine. More than half the people have the equivalent of a bachelor's degree, and the employee mix between federal civil servant, military, and contract employees is [that there are] slightly more civil-servant employees than contractors, whereas during the '60s under the NASA program there were only about a hundred and twenty federal employees and some thirty-eight hundred contract employees. NASA has always relied heavily upon industry to do the majority of the work and [has] tried to keep the civil servants involved in the in-house research and monitoring and supervision-type of activities.

Industry has played an important part in that operation down there. Major support contractors have included the General Electric Company, the Global Associates, Computer Sciences Corporation and Pan American World Airways. On the operational contractor's side, the Boeing Space Division of Boeing Aircraft Company, the Space Division of North American Rockwell, and the Rocketdyne Division of Rockwell [International Corporation] have been the big contractors. [Also,] Lockheed Electronics supported the NASA Earth Resources Laboratory, and then quite a few other small [companies were there also]. So it's a good government-industry team operation.

MR. PYLE: Since you mentioned October 31, 1970, it's odd that the last static firing of the Saturn V stage would happen to fall on Halloween Day. [laughter] What particular projects has NASA been concerned with so far as the test site is concerned?

MR. AUTER: As far as the test site?

MR. PYLE: Yes. Has there been any [other NASA activity there]?

MR. AUTER: Well, up until 1970, of course, our sole goal and objective was Apollo, the lunar program involving Saturn V.

Subsequent to that, since it looked like there was going to be a hiatus of three or more years at least before we would have any propulsion test work to do, we got heavily engaged in environmental concerns and in remote sensing technology. By remote sensing [I mean the following]: a hand-held camera is a remote sensor in a sense; it takes a picture of something from a distance. Instruments placed in an aircraft or on satellites looking at the earth are remotely sensing either by taking a photographic image or by recording transmitted light flux from the object. Therefore, some of the preliminary work in remote sensing results today, of course, in the weather satellite coverage of the cloud cover that everybody watches on TV. A lot of the work done by the early astronauts, particularly in the Skylab, remote senses stuff on the ground. So, increasing the ability of people here on earth to use the products of remote sensing, [which] can meet their needs for their purposes, was a big thing in which we got engaged.

MR. PYLE: Those are interesting byproducts.

MR. AUTER: Right. And concurrent with trying to get these federal agencies at the site to work together in a cooperative thing, we likewise launched a program to try to get the state agencies of Mississippi, Louisiana, Alabama [and] Arkansas to likewise have representation at the site to work together among themselves as well as with the other federal agencies so [that] the state government agencies could take advantage of what the federal government agencies were doing in a more direct bearing; and that the federal agencies then would have a better idea of what the needs of the state people were, rather than coming up with something and saying, "Hey, here is something we've got. Do you want it?"-- because that type of thing [happens].

MR. PYLE: Yes.

MR. AUTER: So the intergovernmental cooperation [is beneficial]. Of course, the big concerns were in the environment and later coming into energy [conservation and production]. The uses of the technical data acquired by remote sensing in census surveys [are numerous; it can be used] in pollution detection, in mosquito control, in detection of plant disease or forest disease, being able to survey crop yield in cotton, in corn, or in Napa Valley, California, wine, or in flood damage assessment. All [of] these kinds of things [you can determine]. Some of them you can get directly from remotely sensed data and some you can extrapolate just one way or another. [Seeing] urban sprawl, [determining] the visitor [level for the] protection of national parks--there is all sorts of stuff that you can use this type of data for. And the [issue] is: can it be obtained in an economical fashion [and] can it be translated and analyzed in an economical and rapid fashion? These are a lot of the techniques which our Earth Resources Laboratory at the site has been addressing so that the average person, the average business, or the average state agency, can afford to use that kind of data.

MR. PYLE: By and large, you are in a phase now where you are utilizing some of the knowledge that you have acquired from the space program.

MR. AUTER: Oh, yes. Then, of course, the Space Shuttle program, as I mentioned previously, was on the drawing board. When it became approved, we launched on a campaign to be selected as the site for doing the static testing of the liquid propellant portions of the Space Shuttle--and we were successful. Consequently, we got that assignment, so we are back--and have been for the last four years--in propulsion testing of the Space Shuttle main engines. Testing of the engines themselves will continue on as long as there is a program. Although it will diminish and level out as time goes by, nevertheless there will be a continuation of the program.

EDITOR'S NOTE: At this time there was a brief interruption. In returning to the interview, Mr. Auter is responding to questions about U.S. unmanned space probes.

MR. AUTER: We are not involved in that program.

MR. PYLE: I was going to ask if you had anything to do [with these projects since] you were talking about remote sensing a while ago. [Did] you all have anything to do with the pictures that we had gotten back from Explorer on Saturn and on Mars before that?

MR. AUTER: We at NSTL have not been directly involved in any of the deep space probes. The data they acquire, however, is a form of remote sensing, [but] they are not standard film techniques. All the information is [gathered] by radiation of reflected light from the body, and those are digitized and put into numbers and the numbers are transmitted by communication and then the images reconstructed on the ground.

MR. PYLE: It's not your standard photograph! [laughter]

MR. AUTER: No.

MR. PYLE: Who's handling Explorer, by the way? Is that NASA project, or is that the air force?

MR. AUTER: It's a NASA program, but it's conducted under the auspices of the Jet Propulsion Laboratory which is a laboratory with Cal Tech [California Institute of Technology]. The Jet Propulsion Laboratory is a contracted element; it's an element of Cal Tech that is essentially under a continuing contract to NASA to do that scientific

exploratory-type work.

MR. PYLE: Okay, I see.

MR. AUTER: NASA has ten field centers around the country. The headquarters is in Washington, and then there is Goddard Space Flight Center in Maryland; the Lewis Research Center in Cleveland, Ohio; the Jet Propulsion Laboratory in California; the Flight Research Center at Edwards Air Force Base, California; Johnson Space Center in Houston, Texas; Marshall Space Flight Center, Huntsville, Alabama; Kennedy Space Center at Cape Canaveral, Florida; National Space Technology Laboratories in Hancock County, Mississippi--am I missing one? -- oh, Langley Research Center in Hampton, Virginia; and Wallops Space Flight Center, Wallops Island, Virginia. Each of them have a different primary thrust. Kennedy, Marshall and Houston are primarily concerned with manned space flight and remote sensing. Lewis Research Center and Langley are predominantly concerned with aircraft research--aerodynamics. Wallops is concerned with the launching of sounding satellites, the Jet Propulsion Laboratory, [with] unmanned space probes, and the Flight Research Center is concerned with flight testing of aircraft and spacecraft. All have pretty good lash-up there, so you have different kinds of expertise at the various places. Then if anyone needs expertise of one kind that they don't have at their own center, they can reach over and borrow and draw and so forth.

MR. PYLE: That's a pretty succinct survey of NASA overall: that's very good. I didn't realize how many different NASA laboratories there were and the kind of work that they did.

MR. AUTER: Well, they are <u>the</u> aeronautics and the astronautic space agency. Of course, there has been a tremendous amount of different kinds of fallout, too, or corollary type of research, come out in the field of medicine--space medicine, for example--in the environment, in the field of energy, in transportation. Of course, all sorts of materials [have been developed, too]. The one that's most quoted is Teflon. The advancement of computer technology to where it is today was probably spurred on by the space program more than any one other item. But, little things like--well, and big things like satellite relay communications--transmitting television programs from here to there, and the weather-watch satellites [were all developed as a result of the space program].1

MR. PYLE: And these are things that touch us every day, too.

MR. AUTER: Oh, yes.

MR. PYLE: I don't know what we'd do without cable [TV] today.

[Laughing]

MR. AUTER: That's right. One thing that's close to the University of Southern Mississippi--and incidentally, we have a resident research center of Mississippi State [University] at the site, and have representation from Southern Miss[issippi]--we have worked on a cooperative project there with Southern Mississippi on satellite relay of medical data.

MR. PYLE: Medical data, yes.

MR. AUTER: The Forrest General Hospital in Hattiesburg is linked in with ambulances which are equipped with transmitters [which] digitize EKGs on patients, transmit that data to a synchronous satellite that's twenty-two 31

thousand miles up and pump it back down to Forrest General, and it comes over clearer than just by radio right there in the hospital.

MR. PYLE: That's fantastic.

MR. AUTER: Anything that requires transmission of data, or analysis of data or handling of data, NASA has been very good at. Another example of the use of remote sensing in a national cooperation is work with the Republic of Mexico in trying to give them the tools whereby they could detect poppy fields that were being used to grow poppies for the production of heroin.

MR. PYLE: Yes, and they can now detect a poppy field.

MR. AUTER: They can now detect poppy fields, but just like the old axiom, "For every action there is an equal and opposite reaction," or, "Where there is a will there's a way," or several others, the net result of that has been the abolition of large poppy fields. [There have been] an awful lot of small poppy fields planted in the shade of trees in forests, so that every time that you get it a little better and a little better to detect them to get troops out to destroy them, the poppy growers come up with another kind of countermeasure.

MR. PYLE: We've been talking about your role in the National Space Technology Laboratory in Hancock County and the fact that the navy has taken over a substantial part and army ammunition factory's in the process of being opened. What lies in the future for the National Space Technology Laboratories so far as space is concerned?

MR. AUTER: So far as space is concerned?

MR. PYLE: Are there any major projects in the making that would utilize the facility that much more?

MR. AUTER: None that I know of that are authorized at the present time.

MR. PYLE: Okay.

MR. AUTER: The space shuttle will, as I say, continue to operate for quite some time.

MR. PYLE: Yes, and you will continue to test.

MR. AUTER: So there will be a role [for NSTL] in the continuing acceptance testing and refurbishment testing of the engines that are used. The role in remote sensing is increasing slightly every year. From a propulsion standpoint, one could certainly envision that there will be an upgrading of the present Shuttle engine to give it additional thrust to enable the payload to keep increasing. If there is a development of a space tug or some other vehicle which might be launched from the Shuttle itself, perhaps the facility could be used in that propulsion test work. If there is to be an attempt to get energy from space, like constructing a large farm of solar energy collectors and transmitting that down to a receiver on the earth, then you will need probably a real heavy-lift launch vehicle to carry those pieces and parts up to construct that station. Such a vehicle could well be a composite of several different Shuttle 32 groups just strapped together. I think that there is a possibility of continued propulsion work there, but not in the immediate future.